UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

E/CN.17/1997/7
27 January 1997

ORIGINAL: ENGLISH

COMMISSION ON SUSTAINABLE DEVELOPMENT
Fifth session
7-25 April 1997

Inventory of ongoing energy-related programmes and activities of entities within the United Nations system, on coordination of such activities and on arrangements needed to foster the linkage between energy and sustainable development within the system

Report of the Secretary-General

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 2	2
I. INVENTORY OF ENERGY-RELATED PROGRAMMES AND ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM	3 - 28	2
II. ROLE OF ENERGY IN MEETING THE CHALLENGES OF SUSTAINABLE DEVELOPMENT	29 - 47	8
III. ASSESSMENT OF THE LINKAGES BETWEEN CURRENT ENERGY ACTIVITIES AND SUSTAINABLE DEVELOPMENT	48 - 53	12
IV. ASSESSMENT OF COOPERATION AND COORDINATION WITH REGARD TO ENERGY ACTIVITIES	54 - 59	14
V. RECOMMENDATIONS AND PROPOSALS FOR FUTURE ACTION	60 - 66	15
Annex. Energy-related programmes and activities within the United Nations system		20

97-01345 (E) 030297

INTRODUCTION

1. The Committee on New and Renewable Sources of Energy and on Energy for Development (CNRSEED) at its second session, in February 1996, requested the Secretary-General to prepare a report on the activities of the organizations of the United Nations system in the field of energy for consideration by the Committee at its third session in 1998. The Commission on Sustainable Development at its fourth session, in 1996, requested the Secretary-General to prepare a report, for consideration at its fifth session, in 1997, providing an inventory of ongoing energy-oriented programmes and activities within the United Nations system, as well as proposals for arrangements, as appropriate, that might be needed to foster the linkage between energy and sustainable development within the United Nations system.[1] The Economic and Social Council, at its substantive session of 1996, requested the Secretary-General to take into account the report and views of the Committee on New and Renewable Sources of Energy and on Energy for Development when preparing the report requested by the Commission.[2]

2. This report has been prepared in response to the above request. It is based on information compiled in-house as well as that provided by the relevant entities within the United Nations system. The report also benefited from the inputs of the Committee on New and Renewable Sources of Energy and on Energy for Development. The outline was discussed and adopted by the Ad Hoc Inter-Agency Group on Energy, which met at Geneva on 12 September 1996. At a follow-up meeting of the Ad Hoc Inter-Agency Group, proposals for future actions and arrangements to foster linkages between entities within the United Nations system concerned with energy and sustainable development were identified and discussed. The present report consists of a description of activities, assessments and conclusions.

I. INVENTORY OF ENERGY-RELATED PROGRAMMES AND ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM

A. Policies in regard to energy-related activities of the United Nations system

3. The policies and programmes of the United Nations system in the energy field contribute to the overall objectives of the organization. An explicit energy-related policy resulted from the United Nations Conference on New and Renewable Sources of Energy, held at Nairobi in 1981. The energy discussion at the United Nations Conference on Environment and Development, held at Rio de Janeiro in 1992, resulted in the recognition that:

> "Energy is essential to economic and social development and improved quality of life. Much of the world's energy, however, is currently produced and consumed in ways that could not be sustained if technology were to remain constant and if overall quantities were to increase substantially. The need to control atmospheric emissions of greenhouse and other gases and substances will increasingly need to be based on efficiency

in energy production, transmission, distribution and consumption, and on growing reliance on environmentally sound energy systems, particularly new and renewable sources of energy. All energy sources will need to be used in ways that respect the atmosphere, human health and the environment as a whole."[3]

The United Nations Framework Convention on Climate Change (UNFCCC), adopted and opened for signature at Rio de Janeiro in 1992, relates in its implementation to the energy policies of the Parties to the Convention. In the subsequent major conferences, energy was invariably addressed as one of the key factors for furthering sustainable development. The Global Conference on the Sustainable Development of Small Island Developing States, held in Barbados in 1994, adopted the Declaration of Barbados and the Programme of Action for the Sustainable Development of Small Island Developing States, which includes a chapter on energy resources that identifies issues, problems and constraints facing small island developing States and recommends ways and means, including policy options, for ensuring adequate, environmentally sound energy supplies for meeting their social and economic development objectives in the most efficient manner.

4. Policy discussions on energy take place in various intergovernmental bodies. The Committee on New and Renewable Sources of Energy and on Energy for Development, a body of government-nominated experts, established with its current mandate in 1992, provides advice on trends in energy exploration and development, especially in developing countries. It discusses all sources of renewable energy and addresses such issues as energy and material intensity. The 1992 mandate is clearly directed towards sustainable energy development. For its deliberations, it is provided with in-depth reports by the Secretary-General. The Committee reports to the Economic and Social Council. The substantive secretariat support is provided by the Division for Sustainable Development of the Department for Policy Coordination and Sustainable Development (DPCSD) of the United Nations Secretariat, in coordination with the Division of Environment Management and Social Development of the Department for Development Support and Management Services (DDSMS) of the United Nations Secretariat.

5. Among the other intergovernmental bodies in which general discussions on energy take place are the Commission on Sustainable Development, the Governing Council of the United Nations Environment Programme (UNEP), (in relation to energy and environment issues), the General Conference of the International Atomic Energy Agency (IAEA) (nuclear energy and related environmental issues), the Conference of the Parties (COP) to UNFCCC (energy in relation to its contribution to the emission of greenhouse gases) and the Ad Hoc Intergovernmental Panel on Climate Change (IPCC), a Panel supported by UNEP and the World Meteorolcgical Organization (WMO) to assess scientific information on climate change and its environmental and socio-economic impacts and to formulate response strategies.

6. At the regional level, policy discussions on energy take place in all regional commissions. They have standing committees on energy or on energy and natural resources. In the Economic and Social Commission for Asia and the Pacific (ESCAP), energy matters are discussed in the Committee on Environment

and Sustainable Development. In the Economic Commission for Europe (ECE), a sustainable energy development strategy is being elaborated.

7. The statistical information on energy in the United Nations system is coordinated by the Department for Economic and Social Information and Policy Analysis (DESIPA) of the United Nations Secretariat and provided through such publications as the Energy Statistics Yearbook and Energy Balances and Electricity Profiles, while global energy trends are reported through the World Economic and Social Survey, which is issued annually.

8. In the aftermath of the United Nations Conference on Environment and Development, several implementing organizations have adjusted the policies that form the basis for their activities, often by submitting policy documents to their governing bodies. In 1996 the United Nations Development Programme (UNDP) produced the UNDP Initiative for Sustainable Energy, which provides the policy framework for its energy activities. The World Bank's energy activities are based on the objectives approved by the Bank's Board of Executive Directors. The Global Environment Facility (GEF) has "translated" the guidance it receives from the COPs of the conventions into an Operational Strategy, which was approved by the GEF Council at its meeting in October 1995. GEF is provided with scientific and technical advice by the Scientific and Technical Advisory Panel (STAP).

9. Recurrent elements in these policy documents are: promoting the design of sustainable energy paths consistent with sustainable development; promoting efficient use of energy; promoting pollution-free energy options; emphasizing projects that involve environmentally sound technologies; and helping developing countries to meet energy development objectives as a means of achieving sustainable rural development.

B. Overview of programmes and activities

10. A wide range of activities has been reported. They are indicated in the annex to this report. The main activities have been classified under energy development, energy supply and energy use. The means of implementation of the programmes and activities vary widely but, on the whole, have involved the preparation of studies and reports; technical assistance, including advisory services by experts in the specific fields; the organization of training workshops, seminars, meetings and conferences; and above all, provision of financial assistance. The magnitude of the financial resources allocated to each project varies widely from multimillion dollar financial assistance projects to allocations of a few hundred dollars by other organizations. The World Bank, UNDP, GEF and IAEA are the main providers of funds for energy projects. The regional development banks also have substantial lending programmes in support of energy sector development.

11. When it comes to funding, a distinction should be made between loans, as provided by the World Bank, and technical assistance. With a total commitment of some US$ 3 billion per annum, the World Bank commands the largest share of activities in energy sector projects, comprising the development of fossil fuels, electricity and renewable sources of energy. Increasingly, attention is

focusing on the efficiency of energy production and use, including demand-side management in electricity development. The World Bank has promoted energy sector reform and increased competition to foster greater efficiency in energy organizations and enterprises. UNDP and the World Bank co-sponsor the Energy Sector Management Assistance Programme (ESMAP), which provides technical assistance to Governments of developing and transitional economies. The activities of UNDP, another major actor, have been in providing funding for a wide range of energy projects through indicative project funding to its programme countries, on an average of US$ 20 million per annum, or through promoting the co-financing of joint projects with donor countries and organizations. UNDP manages the Energy Account, for which it has attracted public and private funds for pre-feasibility studies for energy projects. It has also been involved (with the World Bank and other organizations within and outside the United Nations system) in soliciting public and private funds for financing FINESSE (Financing Energy Services for Small-Scale Energy Users) projects. GEF is continuing to play a significant role in funding incremental costs of energy projects that are related to global environmental problems. IAEA also has significant activities in the field of energy - of the order of US$ 70 million - which, besides covering the issues related to the development and operation of nuclear power plants, their fuel cycles, waste technology and nuclear safety, emphasize comparative assessment of different energy sources in terms of their economic, environmental and health impacts in the process of decision-making for electric sector planning.

12. The United Nations entities are active in all stages of the energy cycle: energy development, supply and use. Activities aimed at capacity-building, awareness-raising and technology transfer can be found throughout the three stages, either as free-standing activities or as part of a broader project. Awareness-raising and training are pursued through seminars, workshops, dissemination of information through publications, and field surveys. Technology transfer activities are mainly related to the promotion of energy efficiency or the development and commercial use of renewable sources of energy, including pilot and demonstration projects.

13. Energy planning, including electricity planning, is taken up as a sectoral activity, but in some instances, a more integrated approach is taken - for example, through the integration of energy policies into overall socio-economic development; the integrated assessment of energy and sustainable rural development; the integration of environmental, social and health concerns into energy planning and analysis; energy and environmental planning in urban areas; and an integrated resource planning approach.

1. Activities related to energy development

14. Most of the activities of a few organizations have been in providing funds for pre-feasibility studies in projects on energy production, distribution, storage and use; promoting the joint financing of energy projects; developing strategies for investment in the energy sector; and planning and providing loans for energy sector development, including electric power.

15. Many programmes at the regional level have been reported. These include implementation of regional programmes on cooperation in the field of energy; renewable resources development; promoting partnerships and business opportunities in the economies in transition; identifying and considering problems related to clean coal mining and utilization; promoting the implementation of commercial projects; and organizing expert group meetings on policies and strategies for the development of energy resources.

2. Activities related to energy supplies

16. Activities in policy development comprise the preparation of reports on the development of renewable sources of energy and on incentives for their increased use; the promotion, development and use of clean coal technology; the promotion of approaches such as co-generation, involving the private sector; improvement in least-cost planning techniques; and the promotion, development and use of nuclear power.

17. Regional projects and programmes have included analysis of gas trade and gas markets with a view to enhancing interregional trade and extension of gas markets in Europe; reports on trade as well as on enhancing interregional trade in energy; and regional studies on wood energy "hot spot maps".

18. Technical assistance activities have included assisting countries in dealing with energy supply issues; providing advisory services on the design and application of energy plans and policies in the petroleum and power sectors; support for research and development in clean coal technology; and the establishment of manufacturing facilities for renewable energy.

3. Activities related to energy use

19. Many activities in the energy sector relate to energy efficiency. In terms of policy development, studies were carried out on energy efficiency and conservation, including demand-side management, and data were collected and published on energy production, trade and use. Technical assistance was provided in the demonstration and dissemination of energy-efficient industrial technologies. Institutional and capacity-building activities have included the development and implementation of sustainable energy strategies, demand-side management and energy efficiency standards, and the development and application of energy intensity indicators, energy labelling systems, the efficient management of energy institutions and enterprises through operational performance, energy efficiency in human settlements, environmental impact assessment and appropriate energy and electricity pricing.

C. Coordination of activities

20. From the information available, there appears to be a certain degree of cooperation and coordination of activities. DESIPA has continued cooperation and coordination with entities within the United Nations system in the collection, analysis and application of energy data and information in such

areas as the Statistical Commission Working Group on International Statistical Programmes and Coordination and the Administrative Committee on Coordination (ACC) Subcommittee on Statistical Activities and in addressing energy issues in the context of the World Economic and Social Survey.

21. DDSMS is cooperating with the World Bank, UNDP and GEF in the implementation of projects at the national, regional and global levels. It is also cooperating with UNDP and ESCAP in the implementation of sustainable energy projects such as the Enhancement of Capacity for Sustainable Energy Services for Rural Development in Asia.

22. The International Research and Training Institute for the Advancement of Women (INSTRAW) conducts research studies, prepares training materials and organizes training activities in close collaboration and coordination with the regional commissions, the International Labour Organization (ILO) Turin Training Centre, DDSMS and other entities within and outside the United Nations system.

23. DPCSD is cooperating with other entities of the United Nations system in the preparation of reports for the Committee on New and Renewable Sources of Energy and on Energy for Development, the Commission on Sustainable Development and other intergovernmental bodies.

24. UNDP and the World Bank have, over the years, been cooperating in ESMAP, with the latter implementing the projects. UNDP, UNEP and the World Bank are the implementing agencies for the GEF, which has been providing incremental costs for projects that have global environmental benefits. The World Bank, UNDP and a number of other entities within and outside the United Nations system are jointly funding the FINESSE programme, in which UNDP is very actively involved.

25. At the regional level, ECE has been cooperating with many other entities within and outside the United Nations system in the implementation of Energy Efficiency 2000 projects. ESCAP is executing the UNDP-funded Programme on Asian Cooperation on Energy and the Environment (PACE-E). UNDP is also cooperating with the World Bank Asia Alternative Energy Unit in a project to mainstream renewable energy and energy efficiency activities into the lending operations of the World Bank in the Asia and the Pacific region.

26. The United Nations Educational, Scientific and Cultural Organization (UNESCO) initiated the high-level World Solar Summit Process (WSSP), with the objective of promoting the development and deployment of renewable energy technologies as a contribution to sustainable development. The World Solar Summit Process was conducted with the active support of several partners, among them ECE, the United Nations Industrial Development Organization (UNIDO) and the International Atomic Energy Agency (IAEA). Under the leadership and guidance of the World Solar Commission, composed of 16 heads of State or Government, WSSP culminated successfully in the World Solar Summit, held at Harare, Zimbabwe in September 1996. The Summit adopted the Harare Declaration on Solar Energy and Sustainable Development and the outline of the World Solar Programme, 1996-2005, which is currently being completed. An inter-agency meeting for consultations took place in Paris in December 1996 as part of the follow-up to the World Solar

Summit to discuss the contribution of the United Nations system to the development and implementation of the World Solar Programme.

27. IAEA is coordinating the joint inter-agency project entitled "Databases and Methodologies for Comparative Assessment of Different Energy Sources for Electricity Generation" (DECADES) in cooperation with a number of regional commissions, the World Bank, UNIDO, WMO and other international organizations. The inter-agency DECADES project being pursued by IAEA is emphasizing comprehensive comparative assessment of the economic, environmental and health impacts of the full energy chains of different electricity generation options in support of sustainable energy development.

28. WMO is cooperating with UNEP in the work of the Ad Hoc Intergovernmental Panel on Climate Change. Meanwhile, the Food and Agriculture Organization of the United Nations (FAO) has been cooperating with the Economic Commission for Latin America and the Caribbean (ECLAC), ESCAP, the World Bank and other international organizations, regional organizations and development banks in many rural development projects. UNIDO is supporting the work of the UNFCCC secretariat through participation in the teams undertaking in-depth reviews of the Annex I National Communications to the COP.

II. ROLE OF ENERGY IN MEETING THE CHALLENGES OF SUSTAINABLE DEVELOPMENT

29. Energy plays a key role in achieving the interrelated economic, social and environmental objectives that lead to sustainable development. In addition, from a national security point of view, a secure and stable energy supply is an important consideration. Peace and international stability are preconditions for sustainable development. The current approach to energy policy worldwide, which is characterized by a strong emphasis on energy supply, without regard to its social, economic and environmental consequences, does not meet the requirements of sustainable development.

30. An energy path that contributes to sustainable development requires a transition from a supply-driven approach to one that pursues energy efficiency, particularly with regard to energy end-use and meeting demand through environmentally sound energy services. This implies that all actors - Governments, the international community, the private sector and non-governmental organizations - should pursue: (a) efficiency in energy production, transmission, distribution and, in particular, energy end-use; (b) a shift towards energy sources and technologies with reduced environmental impact, including emissions of greenhouse gases; and (c) promoting, developing and implementing policies and programmes, as appropriate, designed to ensure their adoption.

31. The current pace of growth in world energy demand, even with a strong emphasis on efficiency, is expected to lead to a substantial increase in aggregate commercial energy demand - under 2 per cent per year between 1995 and 2020.[4] The potential consequences of this scenario are profound, if the growth in energy demand is not met in a sustainable manner. Considering the long lead times involved in the implementation of energy efficiency measures and in the

effective penetration of renewable energy sources in the global energy supply mix, the current trends in power-market restructuring and liberalization worldwide, and the long lifetime of capital equipment, a reappraisal of energy systems with an emphasis on modern technologies is an urgent priority.

32. The level of economic and social development strongly influences the amount and type of energy needed, and at the same time the developments in the energy sector affect economic growth. In developing countries sharp increases in energy services are required to improve the standard of living for their growing populations. The increase in the level of energy services that accompanies growth in per capita GDP will have a beneficial impact on poverty alleviation by increasing employment opportunities and improving transportation, health and education.

33. Many developing countries, in particular the least developed among them, face the urgent need to provide adequate, modern energy services, especially electricity, to billions of people in rural areas. This requires significant financial, human and technical resources. International cooperation should be strengthened to assist the developing countries in meeting their goals and objectives while at the same time ensuring that energy development and use are undertaken in an environmentally sound and sustainable manner. According to a recent UNDP publication,[5] there are, today, good opportunities in remote rural areas of developing countries for using renewable sources of energy at competitive costs to meet the small-scale mechanical or electric power needs of the individual household, farm or village. Advanced renewable energy technologies, in particular modern biomass technologies, which could become widely available in one or two decades, offer the potential for providing energy in rural areas at very competitive costs. Industry would thereby be attracted to rural areas and rural jobs created both in the labour-intensive bio-energy industries and in the industries that low-cost bio-energy would attract to rural areas.

34. Income growth as well as population growth make it imperative to enhance energy efficiency greatly. Research done in the academic and NGO communities has demonstrated that increases in efficiency ranging from 50 to 95 per cent can be achieved with currently available technology and knowledge. Efficiency improvements reduce energy costs (including the costs related to the import of energy sources), extend energy resources and reduce environmental impacts. The benefits accrue to developed as well as developing countries. Although the current use of energy in developing countries is one tenth that of the countries that are members of the Organisation for Economic Cooperation and Development (OECD), it is expected to grow at a much faster rate to meet the requirements for industries, buildings, transport systems and households in the developing countries.

35. Increased energy use in industrialization is a concomitant phase of the development process, entailing urbanization, electrification and the building of other basic infrastructure - all of which serve to raise energy intensity in all sectors of the economy. A significant contribution towards reducing energy intensity in developing countries will come through accelerated investment in energy-efficient technologies that reduce both energy consumption and the use of raw materials with high embodied energy. A high rate of investment speeds up

technological change, since adding new capital to existing stock or replacing the old stock increases the proportion of output produced with energy-efficient technologies. A conscious policy of promoting the adoption and diffusion of energy-efficient technologies and practices is essential towards this end.

36. Current energy prices favour the use of conventional energy sources over renewable energy sources. At the same time, current practices in fuel pricing do not encourage energy efficiency. In most cases there is little or no regard for the external social and environmental costs of the supply. Subsidies in the energy sector for conventional energy sources and nuclear power tend to hamper widespread development and application of renewable energy sources.[6] Policy changes that will lead to the full internalization of environmental costs in prices through the use of economic and fiscal instruments and the removal of permanent subsidies are required if a sustainable energy path is to be pursued.

37. Women have an essential role to play in achieving sustainable energy programmes, with an emphasis on demand-side management and increased use of renewable energy sources. To enable women to participate more easily in energy programmes and projects, it is crucial that women's needs and involvement in both urban and rural areas be given due consideration in the planning of energy services. In urban areas, women's energy needs for domestic as well as economically productive activities need to be given due consideration.[7]

38. The generation, transmission, distribution and use of energy contribute to local, regional and global environmental problems. Extraction and production of energy resources contribute to natural resource depletion and deforestation. Transportation of energy can lead to oil spills, marine pollution and other accidental releases. Transformation activities such as refining can emit hazardous pollutants. Consumption contributes to air and water pollution, aggravation of the greenhouse effect and harmful by-products, including solid and nuclear wastes.

39. Fossil fuels (coal, oil and natural gas) will continue to dominate the energy supply situation for many years to come in both developed and developing countries. What is required then is to reduce the environmental impacts of their continued development and use through better design and management and through the introduction of both voluntary and mandatory instruments for the reduction of local health hazards and environmental pollution as well as emissions of greenhouse gases. For coal utilization, there is a need for further research, development and application of improved technologies for the removal of oxides of sulphur and nitrogen and also for gasification. This will require considerable resources - human, material and, more important, financial - as well as scientific knowledge and know-how.

40. The development and use of natural gas is increasingly being advocated, because it emits lower levels of greenhouse gases and has a less adverse environmental impact. In developing countries, the main problem is an inadequate supply of natural gas. Where the supplies exist, the distribution networks are especially weak and in many cases non-existent. IPCC has stated that CH_4 emissions from natural gas venting, as well as leakage from pipeline

and distribution systems, are significant.[8] Flaring and venting of natural gas has been estimated to be about 5 per cent of world natural gas production.[9]

41. The share of traditional biomass and hydropower, the renewable energy sources currently used in sufficient quantities to contribute significantly to world primary energy demand, will continue to increase in the energy supply mix, although growth in hydropower development will be constrained by environmental concerns. Biomass is consumed at an annual rate of 47 EJ[10] to 55 EJ,[11] mainly for cooking and heating in developing countries, and also in small-scale industry and with some use at larger scales. In the Renewables-Intensive Global Energy Scenario (RIGES),[12] it is projected that the commercial biomass contribution will be 145 EJ by 2025 and 206 EJ by 2050; in this scenario, the use of modernized biomass is expected to grow rapidly (10 per cent per year between 1990 and 2025) because of the multiple benefits it offers. Contribution by such renewable energy sources as solar thermal and photovoltaic, wind and geothermal is also projected to increase and provide a significant share to world commercial energy consumption.

42. During recent decades, there has been a decrease in the acceptance of nuclear power, especially the building of new power plants. A review of opinion surveys concludes that public concerns about nuclear energy focus on the following issues: doubt about economic necessity, fear of large-scale catastrophes and fears regarding the storage of nuclear waste and the misuse of fissile material. Nuclear power expansion has stopped in most countries. The continuing concern with regard to safety and proliferation issues will constrain nuclear power development.[13]

43. However, increased use of nuclear energy is receiving added attention in the light of the growing concern about greenhouse gas emissions associated with the use of fossil fuels. According to IPCC, nuclear energy could replace baseload fossil fuel electricity generation in many parts of the world if generally acceptable responses can be found to concerns regarding reactor safety, radioactive-waste transport and disposal, and nuclear proliferation.[14]

44. The development and use of energy is highly capital-intensive. Estimates have been made of capital requirements for the development and use of energy resources in developing countries. Such estimates are by no means exhaustive, but the indicative figures clearly express the enormity of the requirements. The World Bank, in a study of electric power expansion programmes in 70 developing and transition economies, estimated the average annual growth rate of electricity demand in developing countries to be about 6.6 per cent between 1989 and 1999. This would require raising total generating capacity to 855 gigawatts in 1999 at a cumulative cost of $745 billion (in 1989 United States dollars or almost $1 trillion in current dollars), a large part of which will be in foreign exchange.[15]

45. The World Energy Council (WEC) estimates that in the period 1990-2020, investments in the electric power sector in developing countries will range between $2.4 trillion and $4.4 trillion in 1990 United States dollars, accounting for 64-79 per cent of all energy investments in developing countries in the same period. This translates to a range of $80-$150 billion per year in

the electricity sector alone. Even in the ecologically driven estimate - the one in which all the suggested environmental, global warming and health factors are taken into account - the annual requirements would still be very high. There are also many other competing requirements for financial resources."[16]

46. In the World Economic and Social Survey, 1996, a scenario was developed for the purpose of estimating the probable magnitude of future electric power needs in developing countries, in which - even at a conservative growth rate of 6 per cent a year - developing countries will require an additional 1,170 gigawatts of installed electricity-generating capacity during the period 1994-2010. Estimating an average overall system cost of about $1.6 billion per gigawatt, total investment would be about $1.87 trillion, for an average of about $117 billion a year (nearly 2.5 per cent of GDP). In addition, substantial investment will be needed to replace ageing generating plants, as well as investment to improve efficiency and reduce environmental impacts of fossil fuel use."[17]

47. Meeting the investment requirements of the energy sector in developing countries will require tailoring a financing strategy to different country circumstances and policy priorities. Common to nearly all countries, however, is the considerable scope for cost-recovery from end-users by increasing prices to cover long-term marginal cost. The needs of the poor can be protected by charging low "lifeline rates" to households and somewhat higher rates to other users. This could release subsidies, estimated to be at least $100 billion per year (nearly equal to the annual cost of investment), and at the same time reduce growth in demand, which tends to cause capacity requirements to be overestimated."[18] Similarly, improving maintenance, rehabilitation and upgrading of existing power plants can greatly reduce the marginal cost of expanding service. The World Bank has estimated that electric power delivered to end-users equals only about 40 per cent of installed capacity in developing countries, compared to over 80 per cent of installed capacity in developed countries."[19] Establishing the principle of full (or nearly full) cost-recovery would permit much greater recourse to foreign financing as bond financing for either public or private national enterprises operating on fully commercial principles within an adequate regulatory environment. In these circumstances, foreign direct investment can be tapped. Since such opportunities are likely to be less available to the least developed countries, they will continue to need to rely on official development assistance (ODA) for at least a part of their energy sector financing needs. Rural electrification, because of the much higher unit costs of supply, will also need to rely on public subsidies, which may also be assisted by ODA. GEF can be utilized to meet the incremental costs of energy projects designed to reduce impacts on global warming.

III. ASSESSMENT OF THE LINKAGES BETWEEN CURRENT ENERGY ACTIVITIES AND SUSTAINABLE DEVELOPMENT

48. The activities of many organizations have, over the years, underscored the relation between energy and development and, more recently, energy and sustainable development. The policies and mandates, both before and especially since the United Nations Conference on Environment and Development, have

espoused this trend. The United Nations Conference on New and Renewable Sources of Energy (Nairobi, 1981) has had a significant impact on the programmes and activities of many organizations; many introduced or expanded their programmes and projects in the field of new and renewable sources of energy, as part of the implementation of the Nairobi Programme of Action for the Development and Utilization of New and Renewable Sources of Energy, at a time when the price of oil had risen to an all-time high. However, interest in new and renewable sources of energy subsequently waned substantially, especially beginning in the mid-1980s, as a result of the decline in the price of oil.

49. Since the late 1980s, interest in new and renewable sources of energy has begun to surge again, given the emerging concern about the environmental impacts of the growing use of fossil fuels, including their contribution to the emission of greenhouse gases, and general awareness of the need for sustainable energy systems. This trend is best reflected in General Assembly resolution 46/235, in which, in establishing the Committee on New and Renewable Sources of Energy and on Energy for Development, the Assembly indicated that in addition to implementing the Nairobi Programme of Action, the Committee would consider energy in relation to the environment. Many entities have been pursuing this mandate. With the adoption of General Assembly resolution 47/190 on the report of the United Nations Conference on Environment and Development, in which the Assembly endorsed Agenda 21, and the adoption and entry into force of UNFCCC, the stage was set for linking energy and sustainable development. United Nations organizations have adjusted their programmes and projects in varying degrees to reflect the objectives of Agenda 21.

50. It is clear that a sustainable energy path, challenging as it may be, demands a concerted effort by all actors concerned, including the United Nations system. From chapter I and the annex to this report, it is clear that the United Nations is involved in a broad range of activities in response to the demands and priorities of the countries that they support. In general terms, these activities do not seem to be contradictory to a sustainable energy path. The increasing attention to energy efficiency and the related demand-side management and pricing policies are proof of positive developments. In addition, several organizations contribute to the promotion and dissemination of clean energy technologies, including clean coal technologies.

51. Support for the further introduction and application of renewable energy sources is increasing, with a special emphasis on improving access to energy services by the rural population. In the area of capacity-building and institutional development, energy planning activities are increasingly linked to the broader context of socio-economic or environmental planning and plan implementation.

52. Of special importance, given the level of the activities, are the following developments. The operation of GEF has placed strong emphasis on environmentally sound technologies - in particular, those related to reduced emission of greenhouse gases into the atmosphere. This tends to favour the development of renewable sources of energy. The World Bank, through its loans and technical assistance programmes, has become the single largest source of funding for environmental programmes and projects. It is now integrating social and environmental dimensions into all its operations, including energy.

Consequently, all energy projects are screened for social and environmental impacts. The organization is playing a key role in addressing such issues as pollution from the development and use of energy and the development and use of renewable sources of energy. As part of an effort to bring development cooperation activities into line with sustainable human development, UNDP places special emphasis on sustainable energy through consistent pursuit of more efficient energy patterns and support for major shifts towards renewable sources of energy. It links its energy projects to the overall objectives of the programmes related to poverty alleviation, gender equality and environmental sustainability. The Food and Agriculture Organization of the United Nations (FAO) continues to stress the need to mobilize energy inputs to fulfil the needs of the food production chain in a sustainable manner. The UNESCO-initiated World Solar Summit has drawn considerable political attention to the potential of renewables, and its regional preparatory process has developed a programme portfolio of several hundred projects.

53. The activities of the United Nations and its organizations, although modest in financial terms compared to the overall investment in the energy sector, have an important role as catalysts and models for new developments that meet the criterion of sustainability. It is evident that the United Nations system has a large interdisciplinary potential in the energy field that can be effectively used to support sustainable energy development in developing countries and economies in transition. So far, as already indicated by the Committee on New and Renewable Sources of Energy and on Energy for Development[20] and confirmed by the present report, no common strategy has been developed that would serve as a reference framework for the system as a whole and provide synergy to the activities. Given the enormous challenges of a sustainable energy scenario, the development and adoption of such a common strategy could increase the coherence and effectiveness of United Nations activities in pursuit of energy systems that support sustainable development.

IV. ASSESSMENT OF COOPERATION AND COORDINATION WITH REGARD TO ENERGY ACTIVITIES

54. On the basis of the information available, it may appear that the level of cooperation and coordination with regard to energy activities is encouraging. In fact, however, such cooperation and coordination seem to be rather ad hoc. In terms of general policy development, a common strategy is missing. Although energy issues could be addressed in the Inter-Agency Committee on Sustainable Development, there is no systematic inter-agency dialogue. Inter-agency involvement in the preparation of reports for the Committee on New and Renewable Sources of Energy and on Energy for Development and participation in the meetings is scattered.

55. Activities in energy statistics are adequately coordinated by DESIPA and, at the intergovernmental level, by the United Nations Statistical Commission.

56. The establishment of GEF has led to enhanced and structured cooperation among the World Bank, UNDP and UNEP and has involved other United Nations entities in the implementation of specific projects.

57. UNDP and the World Bank, as the two major funding organizations, have been cooperating over the years in the field of renewable energy programmes, mainly through ESMAP. UNESCO, together with a number of partners within and outside the United Nations system, has secured strong and high-level political support for the wider use of renewable energies, both through the preparatory process for the World Solar Summit and as a result of the Summit itself. This kind of cooperation may form the basis for a broader, system-wide programme on renewable sources of energy. The World Solar Programme that emerged from the UNESCO-initiated World Solar Summit, which has received high-level political support, could constitute an important element of such a system-wide programme, in which other entities outside the United Nations may also wish to take part. ESCAP, IAEA, the World Bank, UNIDO and WMO are cooperating in the IAEA-coordinated inter-agency DECADES project, aimed at enhancing capabilities for comparative assessment of different energy sources in the process of planning and decision-making for the electricity sector in support of sustainable development.

58. At the regional level, the regional commissions are well placed to coordinate policy development and system-wide involvement in implementation. This seems to be well under way in ECE and ESCAP. There is, however, scope for cooperation between the regional commissions and regional development banks.

59. At the country level, coordination is pursued in various manners in response to the local situation. It may benefit from a common strategy and enhanced sharing of experiences.

V. RECOMMENDATIONS AND PROPOSALS FOR FUTURE ACTION

60. It is essential that energy systems worldwide contribute to sustainable development. This requires major changes in the current energy systems. As indicated in section II of this report, that can only be achieved if all actors involved - Governments, international capital markets, energy investors, industry, international organizations, scientific and research institutes, and non-governmental organizations - contribute to a common goal.

A. Towards a common strategy

61. The United Nations, although a modest partner in terms of its financial contribution to energy investment, has an important role to play in developing an energy strategy that will provide a reference framework for the energy-related activities of the United Nations system, including the Bretton Woods institutions. Such a strategy would promote a balanced and mutually reinforcing approach to economic, social and environmental aspects of sustainable energy development. It would foster partnership for sustainable energy development with relevant actors outside the United Nations system, particularly with non-United Nations intergovernmental organizations dealing with energy and the private sector.

62. The strategy would take into account the energy-related outcomes of all major conferences, from the United Nations Conference on New and Renewable

Sources of Energy in 1981 to the United Nations Conference on Human Settlements (Habitat II) in 1996, the ongoing discussions in the context of UNFCCC and other relevant international meetings, such as the World Solar Summit (Harare, 1995), the International Symposium on Electricity, Health and the Environment: Comparative Assessment in Support of Decision-making (Vienna, 1995), the Senior Expert Symposium on Electricity and the Environment (Helsinki, 1991) and the Committee on New and Renewable Sources of Energy and on Energy for Development, as well as recent policy documents and strategies developed by various United Nations organizations. The strategy would provide for a more coherent system-wide response to their implementation.

63. The strategy would build on the experience gained so far in inter-agency cooperation and coordination in the field of energy and would suggest ways and means of enhancing its effectiveness in the future.

64. Specific proposals on such a common approach, including its possible scope and format, may be elaborated over a given time-frame through inter-agency consultations (which may involve, as appropriate, relevant non-United Nations actors) and subsequently submitted for consideration and approval by the Economic and Social Council and the General Assembly, through the Committee on New and Renewable Sources of Energy and on Energy for Development and the Commission on Sustainable Development. The specific modalities for the elaboration of proposals on such a common approach should take into account the availability of financial and staff resources.

B. The role of the Committee on New and Renewable Sources of Energy and on Energy for Development

65. Currently the Committee on New and Renewable Sources of Energy and on Energy for Development is the only body in the United Nations that addresses all aspects of the energy discussion. The Committee should continue to play a useful role in furthering United Nations policy discussion in the field of energy after 1997. However, the modalities of the Committee's functioning could be adjusted in order to enhance its effectiveness. This could include:

(a) Better representation of Governments; currently not all regions have designated their representatives;

(b) Better dissemination of reports;

(c) Better participation of the organizations of the United Nations system, including the regional commissions, in the work of the Committee, including the preparation of reports;

(d) Establishment of links between the Committee and non-United Nations organizations dealing with energy, such as the International Energy Agency (IEA) and the World Energy Council (WEC);

(e) Changing the Committee's pattern of reporting, so that it will report to the Economic and Social Council through the Commission on Sustainable Development (which is already the case for some Committee reports) with a view

to ensuring greater integration of the results of the Committee's work in the sustainable development discussion; there is also a need to ensure that the Committee's work programme takes into account relevant requirements of the Commission on Sustainable Development.

C. Improving inter-agency cooperation

66. It is essential to promote more effective arrangements for inter-agency coordination and cooperation in the field of energy at the global, regional and field levels. This could include:

(a) Making energy a recurrent item on the agenda of the Inter-Agency Committee on Sustainable Development (IACSD) and ensuring linkages with the energy-related aspects of the work of other ACC bodies, including the task forces established to follow up on recent global conferences;

(b) Convening ad hoc meetings of relevant organizations, preferably back-to-back with or in connection with other meetings (such as those of IACSD or the Committee on New and Renewable Sources of Energy and on Energy for Development) in order to:

(i) Elaborate a common approach as suggested in paragraphs 61-64 above;

(ii) Discuss arrangements related to the provision of system-wide support to policy-making processes, including in the Committee on New and Renewable Sources of Energy and on Energy for Development and the Commission on Sustainable Development;

(iii) Promote greater policy coherence between intergovernmental and governing bodies throughout the United Nations system;

(iv) Exchange information and discuss lessons learned from various projects and activities;

(v) Promote data comparability;

(c) Discussing specific arrangements aimed at enhancing the United Nations system's capacity for information exchange in the field of energy. This may include the establishment of an electronic database on energy-related activities, programmes and experiences, which, eventually, may be linked with other relevant databases that exist in the United Nations system.

Notes

[1] Official Records of the Economic and Social Council, 1996, Supplement No. 8 (E/1996/28), chap. I, sect. B, decision 4/15, para. 19.

[2] Official Records of the General Assembly, Fifty-first Session, Supplement No. 3 (A/51/3 (Part II)), chap. V, sect. B.1, resolution 1996/44, para. 1.

[3] Report of the United Nations Conference on Environment and Development, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II, chap. 9, para. 9.9.

[4] Report of the Secretary-General on the main trends in sustainable development (E/CN.17/1997/3).

[5] J. Goldemberg and T. B. Johansson, eds., Energy as an Instrument for Socio-economic Development (New York, UNDP, 1995).

[6] It has been estimated that in non-OECD countries alone subsidies for conventional energy sources and nuclear power amount to $270-330 billion per year. See A. de Moor, "Subsidies and sustainable development; proceedings of the Third Expert Group Meeting on Financial Issues of Agenda 21" (New York, United Nations, 1996).

[7] INSTRAW, in cooperation with the ILO/Turin Centre, prepared a multimedia training package entitled "Women and new and renewable sources of energy". The training package is aimed at different target groups: development planners, senior officials, engineers, managers of energy programmes, representatives of NGOs and community workers at national, regional and international levels.

[8] Climate Change 1995: Impacts, Adaptations and Mitigation of Climate Change: Scientific-Technical Analyses (Cambridge, Cambridge University Press, 1996), sect. 19.2.2.1.

[9] The estimated total world natural gas production in 1995 was about 2,120 billion cubic metres, excluding gas flared or recycled (BP Statistical Review of World Energy, June 1996).

[10] New Renewable Energy Resources - A Guide to the Future (London, World Energy Council, 1994).

[11] D. O. Hall and others, "Biomass for energy: supply prospects", in Renewable Energy: Sources for Fuel and Electricity, T. B. Johansson and others, eds. (Washington, D.C., Island Press, 1993).

[12] T. B. Johansson and others, eds., op. cit.

[13] Climate Change 1995 ... (sect. 19.2.4).

[14] "Policies and measures for mitigating climate change", (technical paper prepared by IPCC, December 1996).

[15] E. Moore and G. Smith, "Capital expenditures for electric power in the developing countries in the 1990s", Industry and Energy Working Paper No. 21 (Washington, D.C., World Bank).

[16] R. K. Pachauri and others, "Financing energy development: the challenges and requirements of developing countries", Round Table Session 4, "Financing Energy Development - Winners and Losers?", Proceedings of the Sixteenth Congress of the World Energy Council (Tokyo, 8-13 October 1995).

[17] World Economic and Social Survey, 1996 (United Nations publication, Sales No. E.96.II.C.1).

[18] Ibid.

[19] World Development Report, 1994 (New York and Oxford, Oxford University Press, 1994).

[20] See Official Records of the Economic and Social Council, 1996, Supplement No. 4 (E/1996/24).

Annex

ENERGY-RELATED PROGRAMMES AND ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
DPCSD	I. Policies and mandates of the entity Decisions of CNRSEED, CSD, ECOSOC and General Assembly on energy, environment and sustainable development; Furthering the development and use of new and renewable sources of energy; Promoting efficiency of energy use as well as energy exploration and development in developing countries. II. Overview of programmes and activities A. Energy development Monitoring and analyzing global energy trends and prospects and their impact on the environment; Monitoring and analyzing developments in new energy technologies for both conventional and new and renewable sources of energy; Preparing studies on these topics for consideration by intergovernmental bodies; Dissemination of relevant information. Organizing seminars and workshops on energy exploration, renewable sources of energy and interface with environment. Undertaking studies aimed at increased understanding of the environmental and socio-economic impact of various policy options and strategies. B. Energy supply Exploring and monitoring the mobilization of new sources of financing for sustainable energy projects and programmes. C. Energy use Undertaking studies of energy efficiency and conservation, including demand-side management, and submitting results/findings to intergovernmental bodies.	Regular budget as specified under DPCSD Contributions from extra-budgetary resources

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
DESIPA	I. Policies and mandates of the entity Promoting and carrying out work in linking energy statistics with environmental statistics including development of environmental indicators II. Overview of programmes and activities A. Energy development Continuing cooperation and coordination within the UN system - Statistical Commission Working Group on International Statistical Programmes, the ACC Sub-Committee on Statistical Activities - and other international organizations including IEA/OECD and Eurostat in refining existing methodologies in the collection and dissemination of energy statistics; Organizing meetings and consultations for such proposes. B. Energy supply Organizing training, seminars and workshops and study tours in energy statistics with a view to enhancing the capacity of national institutions in developing countries to collect and process energy statistics. C. Energy use Developing and applying energy intensity/efficiency indicators. Publishing production and consumption data of different forms of energy including electricity in statistical compendia such as Energy Statistics Yearbook, Energy Balances and Electricity Profiles; Preparing studies in concepts and methods; and analyzing global energy trends such as global oil markets for publication in the World Economic and Social Survey.	Regular budget as specified under DESIPA Contributions from extra-budgetary resources

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
DDSMS	I. Policies and mandates of the entity Promoting the development and application of new and renewable sources of energy, such as solar, wind, biomass and geothermal energy; Establishing or strengthening the capacity of national institutions in energy planning policy making and in establishing national information systems and energy data information processing capacity; Providing technical support and consultancy services to develop national capacity for energy project evaluation and analysis of energy technologies. II. Overview of programmes and activities A. Energy development Preparing studies on new technological developments, techniques and strategies for identifying, evaluating and developing conventional and renewable sources of energy; Demonstrating through pilot projects and advisory services the feasibility of utilizing new and renewable sources of energy in rural areas; Surveying resource potential and developing geothermal energy; Facilitating the transfer of modern technology for increased energy efficiency to developing countries. Organizing interregional seminars, workshops and symposia on energy development, planning and environment; Providing training of technical manpower in different aspects of energy development, including exploration, technological evaluation, energy policies and management, etc., and disseminating specific project and technical reports. B. Energy supply Exploring potential multilateral and bilateral sources for funding technical assistance projects and providing advisory services on project funding.	In addition to regular budgetary resources, programme activities are mostly funded by extra-budgetary resources Among countries receiving DDSMS support are Belize (petroleum, $633,000), China (coalbed methane, $9.3 million; geothermal, $2.7 million; energy efficiency, $60,000), Korea, DPR(energy efficiency, $1.6 million), Egypt (wind power, $260,000), Ghana (LPG substitution for fuelwood, $57,000), India (oil recovery, $1.5 million), Namibia (energy database, $75,000), Oman (coalfield, $1 million), Paraguay (small-scale hydropower, $50,000), Russia (gas marketing, $170,000), Sudan (rural solar, $1.2 million), Uganda (geothermal, $0.5 million).

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ESCWA	Cooperating with UNDP, World Bank and other regional and international institutions in implementing projects in energy supply funded by them. C. Energy use Providing technical assistance and organizing workshops and study tours on rationalizing energy end-use, promoting demand-side management and other efficiency measures Providing technical assistance to foster the efficient management of energy institutions and enterprises through enhanced operational performance. I. Policies and mandates of the entity Providing support to developing countries in the region in energy development and supply; Strengthening energy institutions in least developed member countries; Promoting new and renewable sources of energy; and Promoting regional cooperation in energy development and supply. II. Overview of programmes and activities A. Energy development Preparing studies on energy situation and trends, as well as trends in the oil industry in the region; Preparing overviews of the international oil markets conditions and their implications for ESCWA, and exploring their potential impact on the energy situation in individual countries. Providing technical assistance in energy exploration and development, like recent projects on oil and natural gas development in Jordan and Yemen (in Jordan focusing on review of exploration and drilling activities and investigation of oil potential).	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ESCWA (continued)	B. Energy supply Providing technical assistance in small-scale new and renewable energy technologies (solar and wind) in the region, including country pilot projects such as biogas pilot project in Yemen, and preparing related studies; Organizing seminars and training workshops to review latest developments and conducting training programmes on construction and operation of biogas plants. Providing technical assistance to community development projects (Syria), such as integrated biogas family-size systems with water treatment, solar drying and fish farming; Preparing working papers on development of renewable energy resources in the region with special emphasis on financial requirements and utilization of appropriate technologies, and undertaking assessment and prospects analyses for implementing pilot projects. Preparing studies on the technical and economic aspects of the establishment of a regional electricity network and prospects for interregional cooperation in this field; Organizing expert group meetings on the establishment of a regional electricity network and prospects of its connection with electricity grids in neighboring countries. C. Energy use Promoting the regional approach for efficient use of energy; Formulating and implementing concrete proposals and programmes for demonstration projects at the regional level of energy conservation and of more efficient use of energy in specific sectors. Working on the proposals to set up a regional mechanism for coordinating energy policies and for identifying priority areas at the national level, and reporting to the Commission on progress in this area; Preparing studies and organizing expert group meetings on institutional requirements and modus-operandi of a proposed gas network and on the establishment of a regional gas network.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ESCWA (continued)	Preparing studies on the impact of privatization on power generation in the region, as well as the functioning of independent production in selected ESCWA member states. Undertaking assessment of energy pricing systems in the region.	
ESCAP	I. Policies and mandates of the entity A thematic programming approach has been adopted by ESCAP and energy issues are to be discussed in the new Committee on Environment and Sustainable Development. Energy planning was considered a priority in the context of sustainable development, with environmental concerns integrated into energy policy and planning ; also stressed was the need for the formulation and adoption of effective energy efficiency polices, including the promotion of clean coal technologies. With the increasing severity of air pollution in large cities, ESCAP stressed the need for promoting pollution-free energy options as well as energy efficient technologies. II. Overview of programmes and activities A. Energy Development Preparing issue papers and reports of meetings for consideration by intergovernmental bodies and publishing energy resources development series and electric power data series and bulletins. Organizing ad hoc expert meetings, workshops and seminars on energy, environment and sustainable development. Implementing the Programme for Asian Cooperation on Energy and the Environment (PACE-E), with element "Energy and Environment Planning" implemented by the Asian Institute of Technology, focusing on training in sample design and data processing, application of sectoral energy use assessment and demand scenario to evaluate the potential for energy conservation and fuel switching, and the application of methodologies and procedures for integrating environmental concerns into energy planning and policy analysis.	For activities between 1993-96: Regular budget, $30,097 UNDP funded PAC-E, $2.53 mn French contribution to EEP: $257,739 Australian contribution to CDU: $2.05 million Japanese contribution on energy conservation/efficiency: $478,762 Total Extra-budgetary: $5.86 mn

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ESCAP (continued)	B. Energy supply Within the PACE-E programme, executing the following elements: 1. Training in coal development: coal production, utilization, coal technology and environment; 2. Natural gas and petroleum development: focusing on the strategic potential and implication of utilization of natural gas and the promotion of natural gas utilization in the energy market; 3. Electric power system management: focusing on private sector participation in power generation and its consequences on environmental quality; demand side management in integrated resources planning of the power sector and environment impact assessment; and the role of popular participation in electric power development; 4. Rural energy: integrated rural energy-environment planning for sustainable development and assessment of methodologies in countries of the region 5. New and renewable sources of energy: holding the renewable energy symposium and regional workshops and seminars on wind and geothermal energy development. In addition to the PACE-E programme, ESCAP implemented the man-power training component of the project Rehabilitation of the Phnom Penh Power System. C. Energy Use Promoting energy conservation and energy efficiency; more specifically, within PACE-E, organizing regional workshops and meetings on (i) national strategies and regional cooperation in energy efficiency promotion; (ii) urban transport strategies; (iii) energy conservation and efficiency centers; (iv) energy efficiency standards and (v)the role of consumer organizations and NGOs in promoting energy efficiency. In addition, the regional workshops discussed energy efficiency standards for commercial buildings and related legislation and the promotion of investment in domestic manufacturing of energy-efficiency appliances. Additional extra-budgetary activities include (i) organizing workshops in ten locations to promote commercial energy conservation consulting services in ESCAP region; (ii) providing training programme for energy efficiency center managers from transitional and developing ESCAP countries; and (iii) Promoting effective utilization of petroleum energy in Central Asia through sub-regional seminar.	Implemented by the Joint Coal Board of Australia Implemented by CH4 Group of New Zealand In cooperation with Australia and China Project funded by UNDP and executed by the World Bank

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ESCAP (continued)	In the area of coal utilization, following training courses were organized or planned: (i) Coal Production, Utilization and Environmental Protection (will have completed 5 training of 4-6 weeks by the end of 1997); (ii) Executive Seminar on Coal Technology and the Environment (will have completed 5 seminars of 1-2 weeks by the end of 1997); (iii) Coal Technology and Environmental Management (will have completed 2 four-week training); (iv) National Workshops on Coal Technology and the Environment (will have completed at least 8 national 2/3-day workshops by the end of 1997). Similar activities are expected to be continued beyond 1997. In the power sector, a training course, five national workshops and a regional workshop on demand side management (DSM) in integrated resource planning (IRP) of the power sector were organized. These events emphasized on the efficient utilization of electricity through DSM.	
ECE	I. Policies and mandates of the entity Undertaking an extensive exchange of information, views and experiences between member states on general energy problems, national objectives and policies; promoting the transition of Easter European energy systems to a market economy and their integration into the world energy markets; elaborating a sustainable energy development strategy for the ECE region in order to secure reliable, efficient and environmentally sound production , conversion and use of energy in ECE member countries; promoting the implementation of such a strategy by means of enhanced cooperation within the framework of ECE and with other international bodies in order to achieve an optimal use of experiences and resources. II. Overview of programmes and activities A. Energy Development Analyzing different ways and means of market adaptation of the energy economies to promote the transition of central and eastern European energy systems from central planning to market economy; facilitating exchange of experiences through meetings, workshops and publications. Identifying and considering problems related clean coal mining and utilization; promoting and accelerating the implementation of commercial projects; promoting partnerships and business opportunities in economies in transition.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ECE (continued)	Identifying and examining the problems related to the process of transition to market conditions of the coal industry of the economies in transition, focusing on productivity, costs, demonopolization and privatization of coal industry, environmental impact assessment and development of vertical structures with electric power sector; organizing workshops in economies in transition on coal industry structures and management, utilization of low grade fuels, briquetting and smokeless fuels production, coal mining legislation, reassessment of coal and mineral deposits under market conditions; and geodynamic zoning. Analyzing the issue of integrating the LPG industry in the energy markets of economies in transition B. Energy supply Assisting countries in transition in dealing with electric supply issues through national reports, informal meetings and workshops, focusing on (i) possibilities of refurbishing fossil-fired power stations; (ii) principles and modalities of a programme activity on central European interconnections; (iii) future development of combined production of electric power and heat; and (iv) restructuring of electric power. industries. Conducting a survey of incentives for renewable energy in the ECE region and organizing workshops to promote international exchange of experiences and cooperation for the use of renewable sources of energy in transition countries. Preparing reports and studies on increasing transparency of the international coal trade, and on short-, medium-, and long-term coal demand and supply trends and other associated developments. Examining policy, prospects and strategic aspects of interconnections of the electric power transmission systems between ECE countries. Analyzing gas trade and gas markets with a view to enhancing interregional trade and extension of gas networks in Europe	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ECE (continued)	C. Energy use Organizing workshops, technical meetings and training seminars on pricing and tariff policies and designs of gas and electricity, gas contracting principles and practices, and project analysis and management for gas industry. Introducing and updating an energy-labelling system and processes aimed at the energy efficiency of buildings and appliances; creating a more transparent market for energy-saving goods and avoiding technical barriers to trade. Organizing studies, expert meetings and seminars on energy efficient standards. Implementing "Energy Efficiency 2000" projects through expert meetings, training courses, publications, trade fairs and demonstrations in order to reduce the energy efficiency gap between actual practice and best technologies, between ECE countries, in particular between the formerly centrally planned economies and the market economies, and enhance trade and cooperation in energy efficient, environmentally sound technologies and management practices. Conducting studies and reviews to facilitate exchanges of information and views on energy efficiency and conservation in electric power systems, gas and end-use of gas, focusing on household installations and appliances. Devising a sustainable energy development strategy in the ECE region in order to secure reliable, efficient and environmentally sound end-use of energy. Assisting the economies in transition in using on a wider scale such economic tools as tariffs, market-oriented prices, incentives and tradeable permits in order to develop sustainable energy systems. Collecting and publishing data on energy production, trade and use and computerizing , retrieving and disseminating energy data.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ECA	I. Policies and mandates of the entity Formulating integrated energy policies into overall socio-economic development strategies and providing advisory services on such an integrated approach. Promoting sustainable development and utilization of natural resources and energy through formulation of strategies for inter-country cooperation in the context of Agenda 21. II. Overview of programmes and activities A. Energy Development Implementing strategies for the development of natural resources and energy; promoting the development and utilization of indigenous energy sources; and providing related technical assistance and advisory services to member countries. Also preparing studies on these subjects.	Ad-hoc expert group meeting ($22,600)
	Cooperating with other entities of the UN system, regional and international organizations on emerging energy and environmental issues.	Including ECE, UNEP, World Bank, OAU, and WEC.
	Organizing expert group meetings on the policies and strategies for the development of national and energy resources and preparing studies on the guidelines for petroleum legislation	
	Undertaking study of the economic viability of manufacturing turbines and generators for mini-hydro in African member-states.	Study ($23,000)
	B. Energy supply Exploring the possibilities for electricity interconnections in East Africa and provide technical assistance for this purpose. Preparing studies on the potential contribution of new and renewable sources of energy and on the viability of photovoltaic energy for rural areas; providing technical assistance as required.	

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ECA (continued)	C. Energy use Analyzing energy use, environmental impact of emerging energy trends and related policy issues; providing advisory services on maximizing efficiency of production, conversion, distribution and end use of energy. Providing technical assistance on generation of awareness on environmental issues and appropriate policy issues. Strengthening national and sub-regional institutions in capacity building through technical assistance, workshops and study tours.	
ECLAC	I. Policies and mandates of the entity Providing advice to member states on energy matters, and promoting cooperation with the Latin American Energy Organization(OLADE) and the existing sub-regional institutions for integration of Central America. II. Overview of programmes and activities A. Energy Development Preparing studies and providing technical assistance on restructuring of the oil and electricity industry in member states. Preparing studies on the potentials of new and renewable sources of energy in the region , and promoting the development of specific energy sources, such as geothermal in the region. B. Energy supply Providing advisory services on the design and application of energy plans and policies in the petroleum and power sectors. C. Energy use Undertaking study of the interrelationship between energy, economic growth and development and environment, and providing technical assistance to member states. Preparing studies and providing advisory services on improving management techniques in the energy sector. Preparing studies on the methodologies and analytical instruments for energy studies and evaluation, and providing technical assistance to member countries.	Advisory service to Central American governments

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNEP	I. Policies and mandates of the entity UNEP has a broad mandate to stimulate and promote environmental activities as outlined in its Medium Term Programme and based on the relevant chapters of Agenda 21. UNEP Governing Council also adopted decisions on cooperation and linkages with other UN bodies on environmental matters. A unique feature of the UNEP energy programme is the Collaborating Center on Energy and Environment, which is managed as a UNEP project with the overall objective of supporting UNEP's energy activities in terms of direct programme support, underlying research and implementation of national and regional activities with the general mandate. II. Overview of programmes and activities A. Energy Development Two national studies in India and China on incorporation of environmental concerns in national energy policy. Energy development activities undertaken by UNEP include: (i)Energy Environment seminar for Latin America (jointly with OLADE). (ii)National workshop in India on "Efficiency strategies for the power sector for a sustainable development", jointly with the Government of India and the Energy Management Center. (iii)Power sector reform focusing on the environmental and social implications of the reform process undertaken in a number of countries. (iv)Integrated Resource Planning, jointly with the University of Campinas, Brazil, to develop a manual for integrated resource planning training programmes specifically focusing on developing countries. In addition, UNEP is also implementing GEF energy-related climate change projects and providing various kinds of technical assistance and capacity-building to a large number of developing countries on projects related to climate change.	UNEP funding of $380,000 (India) and $500,000 (China). UNEP contribution $20,000. UNEP input $5,000. GEF funding

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNEP (continued)	B. Energy supply Since 1992, UNEP has been working with IAEA on the "Nuclear Power Plant Sites Emergency Preparedness and Response Database". UNEP has also prepared surveys and studies on environmentally sound technologies and is undertaking case studies to raise awareness about successful applications of sustainable energy technologies in the electricity, transportation and industry sectors. C. Energy use Linking with its Cleaner Production Programme, UNEP is undertaking pilot projects that attempt to remove barriers to implementing energy efficiency in industry. It is also preparing a guidance document for policy-makers and industry decision-makers in developing countries considering setting up (or participating in) voluntary programmes to promote energy efficiency.	
IAEA	I. Policies and mandates of the entity Promoting acceleration and enlargement of the contribution of atomic energy to peace, health and prosperity throughout the world. A significant addition in the activities of the IAEA since 1992, in response to the environmental concerns expressed by the UNCED in Rio, has been the initiation of the programme on Comparative assessment of Energy Sources which, besides covering technical and economic aspects, takes into account the environmental and human health impacts of the full energy chains of different energy sources of electricity generation. This programme is being pursued by the IAEA within the framework of the inter-agency DECADES project (Data BASES and Methodologies for Comparative Assessment of Different Energy Sources for Electric Generation). II. Overview of programmes and activities A. Energy Development Carrying out assessment of uranium resources and developing strategies for their exploitation and utilization through Ad hoc expert group meetings, technical assistance, advisory services and publications; Providing technical assistance and support in exploration of geothermal energy resources using isotopic tracer techniques; Promoting information exchange on improved advanced nuclear power plant designs; providing support to developing countries in implementing nuclear power programmes; promoting nuclear power technology know-how and transfer;	The total annual expenditure on the energy-related programmes and activities of the IAEA is about $70 million. It is difficult to split this expenditure into categories of Energy Development, Energy Supply and Energy Use as there is considerable overlap of activities under different headings

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
IAEA (continued)	Providing technical cooperation and support on nuclear fuel cycle and waste technology (covering raw materials for reactor fuels, spent fuel and radioactive waste). Building up and enhancing national capacity for energy, electricity and nuclear power planning and decision making; strengthening national capacity for comparative assessment of energy systems and for defining sustainable energy policies; building up and strengthening regulatory organs, national nuclear research organizations, and infrastructure for radioactive wastes management. B. Energy supply Undertaking comparative assessment of energy sources; assessing the health and environmental impacts and risks of energy systems; provide related technical cooperation and support. Assessing investment requirements and levelised electricity generation costs of nuclear power plants and alternative options; Assessing greenhouse gas emissions from full energy chains of different energy sources and analyzing greenhouse gas emission mitigation strategies for the energy and electric power sectors; preparing studies on these aspects for consideration of intergovernmental bodies (e.g. IPCC and FCCC); Analyzing costs of pollution abatement systems for electric power plants. C. Energy use Providing technical cooperation and support on nuclear safety (covering safety of nuclear installations, radiation safety and safety of radioactive waste management). Providing technical assistance on the control of radionuclide dispersion and environmental protection; mitigation of emissions from fossil fired power plants (use of electron beam process for removal of sulphur and nitrogen oxides). Preparing studies and publications on energy, electricity and nuclear power status and trends; distributing data bases on technologies in different energy chains for electricity generation; distributing computer tools for comparative assessment of energy systems; distributing technology and safety information on all aspects of nuclear fuel cycle and radioactive waste management.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
FAO	I. Policies and mandates of the entity FAO's member countries have repeatedly requested through both global and regional fora for assistance in implementing the Nairobi Programme of Action on New and Renewable Sources of Energy and, more recently in the adoption of the Agenda 21, which calls for an energy transition to enhance rural and agricultural productivity. FAO's energy activities aim at assisting developing countries to meet their energy requirements in agriculture, forestry and fisheries, as a means of achieving sustainable rural development. FAO maintains that a transition from the present energy supply of mainly firewood and animal and human power to a more diversified and sustainable base and a better use of commercial energy is key to improving the living conditions of rural populations. II. Overview of programmes and activities A. Energy Development FAO's energy activities emphasize the need to develop and promote renewable sources of energy adapted to the socio-economic needs of rural populations, and the efficient use of conventional energy sources. FAO's technical assistance activities recognize that agriculture, forestry and fisheries have a double role and potential as energy consumers and as energy producers in the form of renewable energy. An integrated approach is adopted for the assessment, planning and implementation of energy and sustainable rural development, an approach that is at the core of the world of Latin American and Caribbean Working Group on Rural Energization for Sustainable Development. B. Energy supply Preparation of an assessment of the future energy requirements of agriculture in African countries; wood energy data and projections are a major component of FAO's energy activities. Regional studies and wood-energy "hot-spot" maps are products available from these efforts. Conducting wood energy planning and training of energy, forestry and agricultural officers, such as the Regional Wood-Energy Development Programme for Asia.	In addition to the UN secretariat, FAO collaborates with many different regional and international institutions in energy and rural development projects, including UNDP, ECLAC, ESCAP, WEC, IEA, UNESCO, UNEP, AfDB, SIDA, SEI and OLADE Carried out jointly with AfDB.

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
FAO (continued)	Provision of assistance to a number of Asian and Latin America countries in the organization of National Consultative Meetings on Energy for Rural Development. Adoption of a multi-component strategy, which includes (i)conservation through more efficient use of fuelwood; (ii)increasing productivity of existing forest resources by creating high-yield fuelwood plantations; and (iii)inter-fuel substitution. Sponsoring different regional wood energy networks in Latin America and Asia, such as the Regional Wood-energy Development Programme for Asia. Involvement in renewable sources of energy such as solar, wind, geothermal and hydro. A significant number of projects have been implemented in fields such as solar drying, cooling and communications, wind pumping and water lifting and greenhouse heating with geothermal energy. C. Energy use Efficient energy use. Promotion of fuel-efficient cooking stoves has been under way for many years. Agro-mechanization (low fuel consumption systems; minimum damages to soils), efficient energy and water use in irrigation, and energy efficient fishing vessels. Studies of residual heat from power plants established in rural areas for use as process heat in agro-business is also under study.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNESCO	I. Policies and mandates of the entity Responsible for the development of education, science, social sciences, communication and culture for the benefit of humanity. Promoting solar and other renewable, environmentally-friendly energies, applying a multi-disciplinary approach. Attaching paramount importance to the social dimension of renewable energy as a measure of providing basic energy services to the many who still have no access to them, particularly electricity. In November 1994, the Executive Board approved the creation of a World Solar Commission with the mandate to "advise the Organization, the participants in the World Solar Summit Process and all other interested parties on measures for reinforcing global and regional cooperation in the promotion of renewable sources of energy in order to ensure that the resources available for activities in this field are being allocated in such a way as to maximize their effect, having regard to the present and future needs of Member States." II. Overview of programmes and activities A. Energy Development Organized in Paris in 1993 a High-Level Expert Meeting on "The Sun in the Service of Mankind", launching the process for the holding of a World Solar Summit. The World Solar Summit Process (WSSP) extended over a period of three years and included a series of expert and ministerial-level regional meetings to take stock of the prevailing situation, identify priority areas for the extended use of renewable energies and review basic documents prepared for the World Solar Summit. The Summit took place in September 1996 in Harare, and adopted the "Harare Declaration on Solar Energy and Sustainable Development" and "World Solar Programme 1996-2005: an Outline". B. Energy supply C. Energy use Compilation of the World Solar Programme 1996-2005, which includes projects of national, regional and global levels of high priority. Global level projects include (i) Global Renewable Energy Education and Training Program; (ii)Rural Electrification; (iii)Water Desalination and Purification; (iv)International Renewable Energy Information and Communication System; (v)Industrial Policy, Market Penetration and Technology Transfer	In cooperation with European Commission, the International Energy Agency and the International Solar Energy Society

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNESCO (continued)	For the last eight years UNESCO has organized a summer school on rural electrification for participants (engineers, technicians, government officials and professors) commissioned by their respective governments, institutions or centers, coming from developing countries and having in common the use of the French language. Since 1993 UNESCO has been developing a learning package on energy conservation, energy and environment, energy planning and policy, and renewable sources of energy. This Energy Engineering Learning Package is directed to advanced undergraduate and postgraduate students, as well as practising power and energy engineers in industry; to date eight volumes have been published.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNIDO	I. Policies and mandates of the entity Energy and environment constitutes one of the most important thematic priorities in UNIDO's work programme. Implementation of international agreements is a key work area within its priority which includes assistance to developing countries and economies in transition in meeting the requirements of the UN Framework Convention on Climate Change and the Montreal Protocol. UNIDO is an implementing agency of the Multilateral Fund for Implementation of the Montreal Protocol and executes GEF projects in cooperation with UNDP. II. Overview of programmes and activities A. Energy Development Industry and energy is a central theme of UNIDO's work. UNIDO 's technical assistance programmes address both the supply side, through provision of energy for industry, and the demand side, by improving industrial energy end-use efficiency. Some 60-energy related projects are currently under way, supporting a broad series of initiatives at the policy, institutional and enterprise levels to increase efficiency in power generation and end use of energy, and to provide a solid foundation for the widespread introduction of renewable energy technologies. B. Energy supply UNIDO works with energy ministries and departments, utilities, and private energy companies to raise awareness of new and innovative ways of financing more efficient power generating capacity through build-own-operate(BOO) and build-own-transfer(BOT) schemes. This particularly concerns hydropower projects in Latin America and coal plants in Asia. UNIDO provides technical assistance to power authorities and industrial energy R&D centers, focusing on clean coal and more energy-efficient technologies, improving access to gas supplies, and modern refinery technologies. In addition, UNIDO promotes the development of renewable energy technologies, including biomass, solar, wind, hydropower, hydrogen fuel systems and sources of marine energy.	UNIDO's total programme funding for its technical assistance in energy at any given time during the past ten years has been in the order of $20 million divided equally between energy supply and industrial energy demand

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNIDO (continued)	Given the importance of coal as a cost-effective energy resource in many developing countries, UNIDO is promoting the use of clean coal technology, such as increased application of coal beneficiation, gasification and fluidized bed combustion to increase operating efficiency and reducing emissions. In Africa UNIDO is promoting the use of biomass for industrial energy and supporting local manufacture of the necessary equipment for biomass conversion and use. UNIDO also encourages the development of the manufacturing sector devoted to renewable energy, such as the wind turbine industry in Egypt. To stimulate investment in renewable energy technologies, UNIDO disseminates information on the application of such energy sources as solar, wind and sustainable biomass. A specialized Center for the Application of Solar Energy (CASE) has been set up in Australia to provide an effective service to commercialize solar energy. The Center provides rapid and cost effective support and advice on technologies and markets giving entrepreneurs the confidence to invest in solar and other renewables. C. Energy use Work focuses on technical assistance to improve industrial energy end use efficiency. This includes: energy auditing, provision of customized technical and cost information through experts' services, training, workshops and seminars, information packages including guidelines and manuals, feasibility studies and investment promotion. Primary focus is on energy intensive industries such as iron and steel, non-ferrous, pulp and paper, cement, glass and ceramics, petrochemicals, fertilizers, textiles and food processing. Methodological tools, including a spreadsheet-based, assessed inventory of energy efficient industrial technologies and processes (which includes both industry-specific as well as cross-cutting measures such as cogeneration), has been prepared by UNIDO. These tools have been developed in response to the need to provide sound technical and cost data to energy planners on the impact of accelerating the penetration of energy efficient industrial technologies in developing countries and countries with economies in transition on reducing both the costs of energy inputs and emissions of atmospheric pollutants including greenhouse gases. The tools can also be used by teams preparing National Communications to the COP of the Climate Convention as well as in the identification of activities which could be implemented jointly under the Climate Convention.	Industrial sectors covered include iron & steel, textile, paper & pulp, glass, ceramics, cement, plastic and food processing

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
WHO	I. Policies and mandates of the entity The WHO Global Strategy for Health and Environment establishes several objectives that encompass activities relating to energy development and use, including those aimed at improving technical capabilities for monitoring and assessment of environmental risks to health and for the management of such risks through their prevention, abatement and control. II. Overview of programmes and activities A. Energy Development C. Energy use Among WHO's programmes and activities related to energy development and use are the following: 1. Assessment of air quality in urban areas which relate to the emissions from motor vehicles, industries and energy sources and providing monitoring data and information. B. Energy supply 2. In the areas of water resources development, including dams/reservoirs for hydropower generation , WHO is actively involved in the promotion of environmental management for vector control. 3. Assessing the health risks associated with the use of biomass for cooking and heating through a series of activities concerned with awareness raising, health risk assessment, technology transfer, and capacity building. 4. Carrying out activities in the area of radiation protection, including preparedness and response in radiological emergencies. A network of collaborating centers - Radiation Emergency Medical Preparedness and Assistance (REMPAN) has been established to provide this assistance. 5. Provide in-depth reviews and guidance to developing countries on the use of solar technologies in the rural health sector, focusing on the provision of vaccine refrigerators for the EPI Cold Chain.	Co-sponsored with UNEP under GEMS/Air A joint activity of WHO, FAO, UNEP and UNCHS under PEEM

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
WMO	I. Policies and mandates of the entity WMO continues to assume the role as the authoritative scientific voice in matters relating to atmosphere, water and climate in the world arena as outlined in the WMO Long Term Plans. This is based on relevant chapters in the Agenda 21 and in the implementation of the decisions taken by the Conference of the Parties to the Framework Convention on Climate Change. Coordination and linkages with other international energy related organizations and programmes are assured through the process under the Climate Agenda II. Overview of programmes and activities A. Energy development WMO is promoting sustainable energy production and use in several programmes primarily funded through regular budgets, supplemented by extra-budgetary resources such as the CAEA trust fund, UNDP projects and GEF. WMO energy-related activities include: (i) provision of guidance material and implementation of several training seminars, focusing on use of climate information in development of new and renewable sources of energy such as biomass, hydropower, solar and wind energy. (ii) support to development of energy-related activities within the framework of the UNEP/WMO Intergovernmental Panel on Climate Change. (iii) contribution to the development of methods for comparative assessment of environmental impacts of different energy sources within the framework of the inter-agency DECADES project. B. Energy supply Different forms of energy production, including hydropower, bio energy, solar and wind energy, draw on resources which are more or less directly dependent on climate conditions. A major thrust in WMO programmes is the provision of guidance material and capacity building in the needs and requirements for services to the energy sector. C. Energy use Provision of guidance material and support to training in energy conservation, especially in urban and building development within the framework of a Tropical Urban Climate Experiment (TRUCE).	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNU	I. Policies and mandates of the entity UNU has a mandate to carry out research, advanced training, and dissemination of knowledge on pressing global issues that are the concern of the United Nations and its specialized agencies. Environment forms one of the four Programmes Areas of the UNU, and issues pertaining to energy fall under this area. In this field, UNU is concerned with the promotion and development of renewable energy sources for sustainable development. Particular attention is paid to training and capacity building in developing countries. II. Overview of programmes and activities A. Energy Development B. Energy supply C. Energy use In 1996, UNU participated in the organization of the High-level Expert Meeting on *Solar Energy in East and South-Asia*, which formed a part of the World Solar Summit Process, with the objective of promoting regional cooperation in the development and utilization of solar energy, including photovoltaic, solar thermal, wind, wave and other renewable sources of energy. UNU provides training in solar energy utilization which started in 1995. In geothermal energy, UNU has a long-standing collaborating relationship with the National Energy Authority of Iceland, and has conducted the six-month UNU Geothermal Training Programme without interruption since 1979. By 1995, a total of 163 scientists and engineers participated in the programs which offers training in geothermal exploration, borehole geology, geophysical exploration, borehole geophysics, reservoir engineering, chemistry of thermal fluids, geothermal utilization and drilling technology. UNU also provides training in renewable energy systems. By 1995, a total of 9 courses were conducted with the total participation of 61 fellows from 19 countries.	Jointly with UNESCO, the Japan Solar Energy Society and Akita Organizing Committee By Anna University, India 85% of funding from the Government of Iceland Indian Institute of Technology, India, UNU budget

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
INSTRAW	I. Policies and mandates of the entity INSTRAW pays particular attention to research, training and capacity-building at national and global levels to ensure the involvement of women in environmentally sustainable energy programmes and projects. INSTRAW has a special role in the area of non-technological factors affecting the diffusion process of new and renewable sources of energy. Women's issues are central to the economic, social, cultural and environmental aspects of the diffusion process. INSTRAW provides an important service by collecting information on non-technical aspects of the adoption of new and renewable sources of energy, analyzing it and making it available to international aid agencies as well as governments and NGOs. In this regard, INSTRAW also undertakes research and training programmes. II. Overview of programmes and activities A. Energy development B. Energy supply C. Energy use In the area of women and energy use and development, INSTRAW conducts catalytic research and training activities in close collaboration and co-ordination with agencies within and outside the UN system. The Institute collects, analyses and disseminates information and documentation concerning women and energy; helps identify areas where research and training activities can make a critical difference in the field of women and energy; and promotes , through TCDC, the integration of issues relevant to women into energy policies, programmes and projects, primarily through the conduct of participatory training seminars on "Women and New and Renewable Sources of Energy" at national, regional and international levels in cooperation with the UN organizations and national counterparts. Based on seven years of research (INSTRAW) on women and energy, and on insights gained from the training experiences at ILO-Turin Center, INSTRAW has developed an innovative training package on "Women and New and Renewable Sources of Energy" to promote the integration of women's needs and their participation into the various phases of programmes and projects related to new and renewable sources of energy. The package is aimed at different target groups, including planners, senior officials, engineers, energy programme managers, representatives of NGOs and women's organizations and community workers.	In cooperation with national counterparts, INSTRAW has adopted participatory and self-reliant techniques in applying the innovative training package. Three national training seminars (Dominican Republic, Egypt and Tanzania), one sub-regional workshop for the Mediterranean region (former Yugoslavia-Slovenia) and Arabic-speaking African countries (Libya) and one regional training seminar for Africa (Ethiopia, ECA headquarters) were conducted between 1989 to 1991.

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNDP	I. Policies and mandates of the entity Energy is required in meeting any and all of the basic needs. Through more efficient use of energy and increased utilization of renewable sources of energy, energy can become a critical tool to achieve UNDP's primary programme goals. As part of its efforts to refocus development cooperation activities towards sustainable human development, UNDP began to refocus its analysis of the energy sector, and produced in 1996 "UNDP Initiative for Sustainable Energy" (UNISE). UNISE gives emphasis to two fundamental elements for sustainable energy: (i)the aggressive pursuit of more efficient patterns of energy use, especially end use, to get more energy services and higher benefits out of existing energy resources; (ii)support for a major shift towards the use of new and renewable energy which, ultimately, is the only sustainable source of energy. UNISE focuses on promotion of activities in the following area (i)mobilizing support for indigenous capacity building; (ii)creation of supportive legal, institutional and regulatory climates for sustainable energy development and energy efficiency; (iii)contributing to technology leapfrogging through innovative demonstration projects; and (iv)supporting the formulation and implementation of national energy action programmes. II. Overview of programmes and activities A. Energy Development UNDP seeks to reorient conventional, supply-driven approaches to energy towards sustainable energy, making energy services an instrument to socio-economic development as they impact poverty reduction, environmental protection, generation of livelihoods and gender equity through intensive focus on energy efficiency and renewable sources of energy. Priority Programmes areas have been developed at the global, regional and national levels, including the following: 1. Operationalization of UNISE to assist UNDP Country Offices in implementing the sustainable energy concepts in Country Cooperation Frameworks through core and non-core programmes to mainstream sustainable energy concepts.	Ongoing projects include: 1)Electrification: Haiti Energy Account $87,500 IPF $22,750 2) FINESSE: various countries a) energy efficiency Netherlands $370,000 Energy Account $75,000 b) renewable, Asia/Philippines Netherlands $599,528/$450,000 c) renewable,SADC Netherlands $868,390 OPEC fund $185,000 4)Rural electrification: a) APEC: Japan: $790,000 b)Syria: Japan $ 553,700 c)Kenya: Netherlands $20 mn, GEF $ 4mn, KPLC$500,000 5)Renewable: a)Vietnam: Netherlands $4,500,000 b)Sudan: OPEC Fund $800,000 IPF 1,000,000 c)Honduras: OPEC Fund $75,000 d)Nepal: Netherlands $8,500,000 6)Energy efficiency: a)Yemen: OPEC Fund $234,000 IPF $464,840 7)Cooperation: a)South-East Asia Japan $273,060

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNDP (continued)	2. Building global partnerships for sustainable energy as part of the Rio process working with key stakeholder governments, energy research groups, the private sector, utilities and NGOS. 3. Assisting in the dissemination and commercialization of renewable energy to provide rural energy services. 4. Demonstration for technology leapfrogging to bring information and experience on cutting edge sustainable energy technology to developing countries 5. Promoting energy saving in industrial, utility and commercial applications as a cost effective source of "new" energy for developing countries. 6. Supporting the analysis and development of legislative, institutional and regulatory frameworks to provide a setting for private sector involvement in financing and developing energy in a manner compatible with long term, sustainable socio-economic growth.	Programme linkages with the SEED/GEF Latin American regional Hemispheric Cooperation support and linkages with APEC energy process.

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNDP (continued)	B. Energy supply C. Energy use Most UNDP sustainable energy projects take the demand-side approach, where small-scale energy users are provided with energy services, and whereby use is made of environmentally benign energy technologies. Key features of the programme activities include the following: 1. Energy Account which serves as financing mechanism through which sustainable energy projects are financed with technical assistance from UNDP. 2. The FINancing Energy Services for Small-scale Energy users (FINESSE) which supports activities designed to create the conditions and mechanisms for the credit sector to on-lend to small scale energy users. 3. UNDP-GEF focuses on the reduction of greenhouse gases through demonstration projects using energy efficient technologies and reducing market barriers to non-carbon based energy technologies. 4. UNDP/World Bank joint activities, such as cooperation with the Asia Alternative Energy Unit of the World Bank to provide assistance to developing countries in Asia to enable them to deliver technically feasible and economically viable renewable energy and energy conservation services to residential, commercial and industrial users. 5. UNDP/DDSMS joint design and implementation of sustainable energy projects, such as the jointly designed proposal for "Enhancement of Capacity for Sustainable Energy Services for Rural Development: Asia Region" and the jointly implemented project "Rural Solar Energy Development, Sudan".	Main contributors are the Netherlands, Japan and OPEC Financed through the Energy Account

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
GEF	I. Policies and mandates of the entity GEF energy related programmes and projects are prepared and executed within the Operational Programmes set up in the GEF Strategy and in response to guidance form the Conference of the Parties to the United Nations Framework Convention on Climate Change. the relevant Operational Programmes are (i) removing barriers to energy conservation and energy efficiency; (ii) promoting the adoption of renewable energy by removing barriers and reducing implementation costs; and (iii) reducing the long-term costs of low greenhouse gas-emitting energy technologies. II. Overview of programmes and activities A. Energy development B. Energy supply C. Energy use GEF projects are implemented through its three Implementing Agencies - UNDP, UNEP and the World Bank. Energy related projects funded by GEF as of July 1996 are listed below region by region. 1. Africa: Benin, Mali, Mauritania, Mauritius, Morocco, Senegal, Tanzania, Tunisia, Uganda, Zimbabwe. Projects covering: energy efficient building technology, household energy, wind power, biogas plant, sugar bio-energy technology, solar water heating, photovoltaic pilot phase for rural electrification and for household and community use, carbon sequestration, and sustainable and participatory energy management. 2. Asia & Pacific: China, India, Indonesia, Pakistan, Philippines, Sri Lanka, Thailand. Projects covering: development of coal-bed methane resources, small hydro power, renewable small power, geothermal fuel efficiency in road transport, electricity energy efficiency, capacity building in renewable. 3. Europe: Hungary, Lithuania, Poland, and Romania. Projects covering: geothermal, coal to gas project, energy efficiency and capacity building for GHG emissions reduction through energy efficiency. 4. Latin America and the Caribbean: Brazil, Costa Rica, Jamaica, Mexico, Peru. Projects covering: biomass integrated gasification, wind power, demand side management, high efficiency lighting, and energy conservation.	Regional total: $39.80 millions Regional total: $237.10 million Regional total: $44.17 million Regional total: $25.70 million

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
World Bank	I. Policies and mandates of the entity The World Bank group promotes economic and social progress in developing countries by helping raise productivity so that people live better and fuller lives. In addition to its regular investment portfolio, the World Bank invests in projects with primarily environmental objectives. The World Bank is also an implementing agency of the Global Environmental Facility (GEF) and the Multilateral Fund for the Montreal Protocol (MFMP). The World Bank provides loans and technical assistance to developing countries in all aspects of the energy sector, including power supply and power sector restructuring, gas system development, rural electrification, hydropower development and regional electric interconnection. It also prepares studies on related technical and policy issues, including energy efficiency and energy conservation measures. The world Bank supports economic development of alternative energy sources such as mini-hydro, wind and solar energy, as well as geothermal and biomass. II. Overview of programmes and activities A. Energy development The World Bank provides loans and technical assistance aimed at the development of the energy sector of developing countries. A sample of such projects is given below to give an overview of their content and objectives. Energy Resource Development (Poland): improves the convertible currency earnings of Poland by increasing domestic production of natural gas and encouraging energy conservation for all forms of energy and fuel substitution through energy price reform.	$250 million, IBRD

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
World Bank (continued)	Heat Supply Restructuring and Conservation (Poland): supports implementation of a comprehensive restructuring of the energy sector, commercialization and privatization of restructured enterprises and of petroleum exploration and production, introduction of a regulatory framework and improvement in energy pricing policies; other project components including district heating, energy conservation and energy-efficient equipment and systems	$340 million, IBRD
	Coal Environment and Social Mitigation (India): assists Coal India in making coal production more environmentally and socially sustainable.	$65 million, IBRD
	Caltex Ocean Gas and Energy Limited (China): build and operate a cavern storage and terminal facility with 20,000 cubic meter capacity for liquefied petroleum gas.	$31.3 million, IFC
	Kazgermunai (Kazakstan): develops the reservoir of an oilfield in Akshabulak to produce 23,000 barrels a day peak production.	$65.7 million, IFC
	B. Energy supply	
	Alternate Energy (India): promotes and commercializes investment in wind farms and solar photovoltaic power systems thorough the provision of below-market loans to investors in these systems, primarily from the private sector. Other components includes public education programmes on renewable technologies.	$26 million, GEF
	Renewable Resources Development (India): promotes commercialization of renewable resources technologies by financing private sector investments in alternate energy subprojects, including irrigation-based small hydros, wind farms, and solar photovoltaic systems. It expands bagasse-based paper mills and creates marketing and financing mechanisms for the sale and delivery of alternate energy systems.	$75 million, IBRD $115 million, IDA
	Ertan II Hydroelectric (China): the construction of a dam on the Yalong river, an underground powerhouse complex. Other components include consulting services for engineering , procurement and power pricing.	$550 million, IBRD
	Leyte-Luzon Geothermal (Philippines): assists in meeting the rapidly growing demand for electrical power using technology that substantially reduces greenhouse gas emissions.	$30 million, GEF

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
World Bank (continued)	C. Energy use Energy Sector Rehabilitation (Burundi): promotes rational energy policies and efficient management of energy resources; improves energy efficiency through reforms in the pricing structure of electricity, petroleum products and woodfuels; develops efficient institutions in the sector and improves the quality of public investment; expands access to electricity, and support charcoal efficiency and improved stove programs.	$23 million, IDA
	District Heating Rehabilitation (Estonia): promotes energy efficiency and the economy by supporting the conversion and replacement of small boilers for use of peat and wood, to be harvested and used in an environmentally sustainable manner. Other components includes wastewater reduction, and installation of new substations with heat meters.	$38 million, IBRD
	Promotion of Electricity Energy Efficiency (Thailand): comprises a five year demand side management plan, which seeks to build institutional capability in the power sector and throughout the economy.	$9.5 million, GEF
AfDB	I. Policies and mandates of the entity The AfDB set up the African Energy Programme (AEP) in 1992 to carry out an in-depth analysis of the African energy situation. The AEP is a three-phased programme, with phase I aimed at developing regional energy specific analytical tools, phase II reflecting on the future energy development prospects and phase III focusing on sub-regional and regional project preparations and on providing support to institutional capacity building. II. Overview of programmes and activities The Afdb has generated a wide range of outputs through implementation of phases I and II activities. These include energy sector analytical tools, regional analytical reports on biomass, oil and gas, electricity, coal, renewable energy and nuclear. Also produced are a range of issue specific reports on energy resource assessment, household energy, agriculture and energy, energy and the environment. Each set of outputs contains specific conclusions drawn upon observable past and postulated future trends, and recommendations on policy measures targeted at increasing the quantity and quality of AfDB's energy services.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ADB	I. Policies and mandates of the entity The ADB's Medium-Term strategy stresses its role in catalyzing and augmenting external capital flows into developing member countries (DMCs) through increased cofinancing and through encouraging DMCs to adopt policies creating an environment suitable for attracting external capital. Country strategies in turn define the priorities for ADB's operations. In the energy sector, the ADB's recommended policy initiatives focus on enhancing private sector participation to fund the large scale energy investments of the 1990s; energy efficiency, both on supply and demand sides; and closer integration of environmental considerations in energy development. II. Overview of programmes and activities A. Energy development ADB actively encourages the DMCs to adopt market-related prices for hydrocarbons. ADB emphasizes that oil price stabilization funds be phased out. ADB's approach maintains that natural gas pricing should approximate the realistic market prices of alternative fuels. Pricing of coal should follow the same principle, based on prices of internationally traded coals. In the power sector, the ADB's approach has been to encourage DMCs to recover the full cost of supply, including the cost of capital, while simultaneously focusing on optimal efficiency of supply by stipulating both tariff covenants and efficiency covenants. Will also encourage washing and benefication of coal and blending of coal to minimize problems relating to the emission of particulates and SOx. Will promote the use of clean coal technologies, such as fluidized bed boilers, integrated gasification and combined cycle plant and coal gasification. Will continue to extend its support for technically and economically feasible and environmentally sound hydropower projects that form part of a country's least cost energy development plan.	

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
ADB (continued)	B. Energy supply ADB has consistently advocated improvements in power subsector load forecasting and least-cost planning techniques to avoid excessive capacities and reserve margins. ADB also accorded high priority to reducing auxiliary consumption of generating units as well as transmission and distribution losses. Will encourage utilities to rehabilitate and retrofit in a cost-effective manner their older generating units and substations to optimize efficiency. Efficient and economic O&M practices as well as load management efforts will receive special encouragement. Promotion of technologies such as cogeneration and private sector involvement would be specially encouraged. ADB's assistance to rural energy planning would focus on (i) the role of fuelwood in energy planning for rural areas; (ii)augmentation of fuelwood supplies from commercial fuelwood plantations, and (iii)fuelwood use efficiency. ADB will support sustainable fuelwood production by promoting incentives such as land use policy reforms, security of property rights, and improved benefit sharing arrangements. ADB would give priority to assisting schemes that are economically and financially viable rural electrification projects. C. Energy use ADB also promotes a widespread acceptance of demand-side management (DSM). ADB encourages utilities to incorporate into their energy planning models the key elements of integrated resource planning. ADB will also promote the establishment of energy service companies to undertake energy efficiency improvements in the premises of consumers. It will encourage simultaneous shifts in government policy and related legislative changes	Projects aiming to improve energy efficiency and protect the environment accounted for about 30 per cent of ADB's lending in the energy sector in 1992.

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
	Special Section on Coordination of Activities	
DPCSD	Cooperation with other UN entities in the preparation of reports to intergovernmental bodies.	
DESIPA	Continued cooperation and coordination with entities within the UN system and other international organizations in refining existing methodologies in the collection and dissemination of energy statistics	
DDSMS	Cooperation with UNDP, World Bank and other regional and international institutions in implementing projects funded by them.	
ESCAP	Executing a project (Programme for Asian cooperation on Energy and Environment) financed by UNDP; Plans to implement the Asian component of Energy Efficiency 2000; collaborating in DECADES project.	
ECLAC	Cooperation with OLADE and the existing sub-regional institutions for energy integration of Central America; Plan to implement the regional component of Energy Efficiency 2000	
ECE	Cooperating with other regional commissions in particular in the implementation of energy Efficiency 2000 project in their respective regions; Cooperation with UNESCO in the World Solar Summit Process.	
ECA	Cooperation with other entities of the UN system, regional and international organizations on emerging energy and environmental issues, such as Energy Efficiency 2000 project; Participating in the senior advisory group meetings on the redesign of UNEP energy and transport policies; cooperating with the World Bank in the preparation and servicing of a workshop on environmental sustainability and energy development; Cooperation with OAU and the World Energy Council in the preparation of the First Pan-African Energy Minister Conference.	
ESCWA	Participation in the organization of meeting, conferences and substantive contributions as well as regular contacts for coordination of activities; Implementation of joint energy projects.	

/...

UN organizations	Energy-Related Programmes and Activities	Funding & Operation
UNEP	Coordination is achieved in many activities through jointly organizing, funding or executing events or projects. In addition, some of UNEP's projects inherently provide a framework for coordination. For example, the Global Environmental Information Exchange Network (INFOTERRA) is one of the most comprehensive information exchange networks in the world, designed by UNEP to stimulate and support the exchange of scientific, technical and environmental information within and between nations. It is comprised of 173 National Focal Points, processes approximately 50,000 queries annually, and links approximately 8,000 national and international institutions and experts from various sectors.	
IAEA	Coordinating the joint inter-agency DECADES project on Comparative Assessment of Energy Sources; Coordinating preparation and convening of the International Symposium on Electricity, Health and the Environment; cooperating with development banks and other international institutions on integrated approach to energy and electricity planning; contributing to IPCC and FCCC work; cooperating with UNESCO in the World Solar Summit Process.	
UNDP	Cooperation with the World Bank in the implementation of ESAMP for studies in energy sector, including natural gas, petroleum, and power sub-sectors, as well as household energy requirements; Cooperation with World Business Council for Sustainable Development in the design and implementation of energy and water in selected countries; Cooperation with other multilateral institutions, bilateral donors and the private sector in the FINESSE programme.	
UNU	Cooperation with DDSMS on the feasibility for establishing a network of centers of excellence on new and renewable sources of energy.	
WHO	Cooperating with other UN bodies on Inter-Agency Risk Assessment of Large Industrial Complexes and Energy Production Systems(IAEA, UNIDO and UNEP)	
UNESCO	Cooperating with other entities within the UN system and on a bilateral basis in the World Solar Summit Process.	